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ABSTRACT OF THE INVENTION

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3 SA A new three-dimensional (3D) MR imaging pulse sequence can
4 produce over 100 high-resolution, high-contrast images in as
5 little as 6 minutes of imaging time. Without additional imaging
6 ✓ time, this same image data can be post-processed to yield high-
7 resolution, high-contrast images in any arbitrary orientation.
8 Thus, this new pulse sequence technique provides detailed yet com-
9 prehensive coverage. The method of this invention relates to a
10 preparation-acquisition-recovery sequence cycle. The first step
11 is magnetization preparation (MP) period. The MP period can
12 employ a series of RF pulses, gradient field pulses, and/or time
13 delays to encode the desired contrast properties in the form of
14 longitudinal magnetization. A data acquisition period includes
15 at least two repetitions of a gradient echo sequence to acquire
16 data for a fraction of k-space. A magnetization recovery period
17 B is provided which allows T1 and T2 relaxation before the start of
18 the next sequence cycle. The MP, data acquisition and magnetiza-
19 tion recovery steps are repeated until a predetermined k-space
20 volume is sampled.

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